

to ensure that existing systems, such as the Inmarsat and the AMSC systems, would not be subject to additional coordination procedures. At WRC-95, the U.S. should clarify this position with appropriate language in the allocations.

### 3.6.6. Summary

This section has identified areas where Regulatory/Procedural proposals need to be developed for WRC-95. In the Appendix are excerpts from ITU-R documents which provide more detailed descriptions of the methods and calculations referenced in the text.<sup>2</sup>

## 3.7 Proposals

### 3.7.1 Sharing Proposals

#### MOD 731E

The use of the band 1610-1626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to the application of the coordination and notification procedures set forth in Resolution 46 (WARC-92). A mobile earth station operating in either of the services in this band shall not produce ~~an~~ a mean e.i.r.p. density in excess of -15 dB (W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. 732, unless otherwise agreed by the affected administrations. In the part of the band where such

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will not accept any commitment for this form of coordination arising from omission of the term "non-geostationary" in the text of certain footnotes, e.g. Footnote Nos. 726x and 7xx, to the Table of Frequency Allocations in Article 8. This reservation is made on behalf of all national and international organizations for whose frequency assignments the two countries are the notifying Administrations.

<sup>2</sup> See Final Protocol No. 679 WARC-92 Final Acts. The text reads:

Referring to statements relating to the frequency range below 3 GHz concerning mobile-satellite services, it is necessary to highlight an oversight in drafting and reading texts which could lead to a new and unnecessary burden of coordination between geostationary space stations and terrestrial services in certain frequency bands. Accordingly, the above Administrations will not accept any commitment for this form of coordination arising from omission of the term "non-geostationary" in the text of certain footnotes, e.g. Footnote Nos. 726x and 7xx, to the Table of Frequency Allocations in Article 8. This reservation is made on behalf of all national and international organizations for whose frequency assignments the two countries are the notifying Administrations.

systems are not operating, a value of -3 dB (W/4 kHz) is applicable. ~~Stations of the mobile-satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 732 and stations in the fixed service operating in accordance with the provisions on No. 730.~~

- Reason** Inclusion of the term "mean" is intended to clarify how the e.i.r.p. density limit should be measured. The text proposed for deletion at the end of this provision is unnecessary to protect the primary allocation status of the identified services and creates confusion and ambiguity concerning the primary status of the mobile-satellite service in the 1610-1626.5 MHz band.
- SUP 733E** ~~Harmful interference shall not be caused to stations of the radio astronomy service using the band 1610.6-1613.8 MHz by stations of the radiodetermination-satellite and mobile satellite services. (No. 2904 applies.)~~
- Reason** This provision is unnecessary to protect the primary allocation status of radio astronomy and creates confusion and ambiguity concerning the status of the satellite services that are allocated on a primary status in the 1610-1626.5 MHz band.
- MOD 746B** In the band 2160-2200 MHz coordination of space stations of the mobile-satellite service with respect to terrestrial services is required only if the power flux density or Fractional Degradation Percentage at the Earth's Surface exceeds the threshold limits in No. 2566, in Recommendation (TG 2-2/TEMP/89 (Rev2)).
- NOC 746C** In the United States, the use of the bands 1970-2010 MHz and 2160-2200 MHz by the mobile-satellite service shall not commence before 1 January 1996
- Reason** This facilitates the early introduction of emerging mobile-satellite technology.
- MOD 753F** The use of the band 2483.5-2500 MHz by the mobile-satellite service and the radiodetermination-satellite service is subject to the application of the coordination and notification procedures set forth in Resolution 46 (WARC-92). Coordination of space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services is required only if the power-flux density

produced at the Earth's surface exceeds; ~~the limits in No. 2566.~~

-150 dB (W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-150 + 0.65 (δ-5) dB (W/m<sup>2</sup>) in any 4 KHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-137 dB (W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space conditions.

In respect of assignments operating in this band, the provisions of Section II, paragraph 2.2 of Resolution 46 (WARC-92) shall also be applied to geostationary transmitting space stations with respect to terrestrial stations.

**Reason**

To facilitate the introduction of mobile-satellite systems in this band while providing adequate protection of analog point-to-point and multipoint fixed systems in the band.

### 3.7.2 New Allocations

**MHz**  
**1525 - 1530**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1525 - 1530</b>  SPACE OPERATION (space-to-Earth)  FIXED  <u>MOBILE-SATELLITE</u> (space-to-Earth)  <del>MARITIME</del> <del>MOBILE-SATELLITE</del> <del>(space-to-Earth)</del>  <del>Land-Mobile-Satellite</del> <del>(space-to-Earth)</del> 726B  Earth Exploration-Satellite  Mobile except aeronautical mobile 724  722 723B 725 726A 726D	<b>1525 - 1530</b>  SPACE OPERATION (space-to-Earth)  MOBILE-SATELLITE (space-to-Earth)  Earth Exploration-Satellite     Fixed    Mobile 723    722 723A 726A 726D	<b>1525 - 1530</b>  SPACE OPERATION (space-to-Earth)  FIXED    MOBILE-SATELLITE (space-to-Earth)     Earth Exploration-Satellite  Mobile 723 724    722 726A 726D

**Reason:** To make allocation generic.

**MHz**  
**1530 - 1533**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1530 - 1533</b>  SPACE OPERATION (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth)  <del>MARITIME</del> <del>MOBILE-SATELLITE</del> (space-to-Earth) <del>LAND-MOBILE</del> <del>SATELLITE</del> (space-to-Earth)  Earth Exploration-Satellite Fixed Mobile except aeronautical  722 723B 726A <u>726C</u> 726D	<b>1530 - 1533</b>  SPACE OPERATION (space-to-Earth)  <del>MARITIME-MOBILE-SATELLITE</del> (space-to-Earth)  <u>MOBILE-SATELLITE</u> (space-to-Earth)  <del>LAND-MOBILE-SATELLITE</del> (space-to-Earth)  Earth Exploration-Satellite  Fixed  Mobile 723  722 726A 726C 726D	

**MOD 726C**

The band 1530 -1544 MHz is allocated to the mobile-satellite (space-to-Earth) service, and the band 1626.5 - 1645.5 MHz is allocated to the mobile-satellite (Earth-to-space) service, on a primary basis subject to the following conditions: maritime mobile-satellite distress and safety communications shall have priority access and immediate availability over all other mobile-satellite communications operating under this provision. Communications of mobile-satellite system stations not participating in the global maritime distress and safety system (GMDSS) shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

**Reason:**

To make allocation generic.

**MHz**  
**1533 - 1559**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1533 - 1535</b>  SPACE OPERATION (space-to-Earth)  <del>MARITIME</del> <del>MOBILE-SATELLITE</del> <del>(space-to-Earth)</del>  <u>MOBILE-SATELLITE</u> (space-to-Earth)  Earth Exploration-Satellite  Fixed  Mobile except aeronautical mobile  <del>Land Mobile</del> <del>Satellite</del> <del>(space-to-Earth)</del> 726B  722 723B 726A <u>726C</u> 726D	<b>1533 - 1535</b>  SPACE OPERATION (space-to-Earth)  <del>MARITIME MOBILE-SATELLITE</del> <del>(space-to-Earth)</del>  <u>MOBILE-SATELLITE</u> (space-to-Earth)  Earth Exploration-Satellite  Fixed  Mobile 723  <del>Land Mobile-Satellite</del> <del>(space-to-Earth)</del> 726B  722 726A 726C 726D	
<b>1535 - 1544</b> <del>MARITIME MOBILE-SATELLITE</del> <del>(space-to-Earth)</del> <del>Land Mobile-Satellite</del> <del>(space-to-Earth)</del> 726B <u>MOBILE-SATELLITE</u> (space-to-Earth)  722    726A    726C    726D    727		
<b>1544 - 1545</b> MOBILE-SATELLITE (space-to-Earth)  722    726D    727    727A		

Allocation to Services		
Region 1	Region 2	Region 3
<b>1545 - 1555     <del>AERONAUTICAL MOBILE SATELLITE (R)</del></b> (space-to-Earth) <b><u>MOBILE-SATELLITE</u></b> ( <u>space-to-Earth</u> )  722    726A    726D    727    729    729A    730 <u>730C</u>		
<b>1555 - 1559     <del>LAND MOBILE SATELLITE</del></b> <del>(space-to-Earth)</del>  <b><u>MOBILE-SATELLITE</u></b> ( <u>space-to-Earth</u> )  722    726A    726D    727    730    730A    730B    730C		

**Reason:** To make allocations generic and to provide priority access and immediate availability for aeronautical and maritime distress and safety communications.

#### **MOD 730C**

The band 1545 - 1559 MHz is allocated to the mobile-satellite (space-to-Earth) service, the band 1646.5 - 1660 MHz is allocated to the mobile-satellite (Earth-to-space) service, and the band 1660 - 1660.5 MHz is allocated to the mobile-satellite (Earth-to-space) and radio astronomy services, on a primary basis subject to the following conditions: the aeronautical mobile-satellite (R) service shall have priority access and immediate availability over all other mobile-satellite communications within a network operating under this provision; mobile-satellite systems shall be interoperable with the aeronautical mobile-satellite (R) service; account shall be taken of the priority of safety-related communications in the other mobile-satellite services.

**MHz**  
**1626.5 - 1660.5**

Allocation to Services										
Region 1				Region 2				Region 3		
1626.5 - 1631.6				1626.5 - 1631.5						
<del>MARITIME MOBILE SATELLITE</del> <del>(Earth-to-space)</del>				MOBILE-SATELLITE (Earth-to-space)						
<u>MOBILE-SATELLITE</u> <u>(Earth-to-space)</u>										
<del>Land Mobile Satellite</del> <del>(Earth-to-space)</del> 726B										
722	726A	<u>726C</u>	726D	722	726A	726C	726D	727	730	
727										
730										
1631.5 - 1634.5 <del>MARITIME MOBILE SATELLITE (Earth-to-space)</del> <del>(space-to-Earth)</del> <del>LAND MOBILE SATELLITE (Earth-to-space)</del> <del>(space-to-Earth)</del> 726B <u>MOBILE-SATELLITE</u> <u>(Earth-to-space)</u>										
722	726A	726C	726D	727	730	734A				
1645.5 - 1646.5 MOBILE-SATELLITE (Earth-to-space)										
722	726D	734A								
1646.5 - 1656.5 <u>MOBILE-SATELLITE (Earth-to-space)</u>										
<del>AERONAUTICAL MOBILE SATELLITE (R)</del> <del>(Earth-to-space)</del>										
722	726A	726D	727	729A	730	<u>730C</u>	734A			
1656.5 - 1660 <u>MOBILE SATELLITE (Earth-to-space)</u>										
<del>LAND MOBILE SATELLITE (Earth-to-space)</del>										
722	726A	726D	727	730	730A	730B	730C	734A		



Allocation to Services		
Region 1	Region 2	Region 3
<b>1660 - 1660.5 RADIO ASTRONOMY</b>  <del>LAND MOBILE SATELLITE (Earth to space)</del>  <u>MOBILE-SATELLITE (Earth-to-space)</u>  722    726A    726D    730A    730B    730C    736		

**Reason:**

To make allocations generic and to provide priority access and immediate availability for aeronautical and maritime distress and safety communications.

**MHz**  
**1675 - 1710**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1675 - 1690</b> METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MOBILE SATELLITE (Earth-to-space) 722		
<b>1690 - 1700</b> METEOROLOGICAL AIDS METEOROLOGICAL SATELLITE (space-to-Earth) <u>MOBILE SATELLITE</u> <u>(Earth-to-space)</u> Fixed Mobile except aeronautical mobile  671 722 741	<b>1690 - 1700</b> METEOROLOGICAL AIDS  METEOROLOGICAL-SATELLITE (space-to-Earth)  <u>MOBILE SATELLITE</u> <u>(Earth-to-space)</u>  671 722 740 742	

**MHz**  
**1700 - 1710**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1700 - 1710</b> <b>FIXED</b> <b>METEOROLOGICAL-SATELLITE</b> (space-to-Earth) <u><b>MOBILE SATELLITE</b></u> <u><b>(Earth-to-space)</b></u>  Mobile except aeronautical mobile  671 722 743A	<b>1700 - 1710</b> <b>FIXED</b> <b>METEOROLOGICAL-SATELLITE</b> (space-to-Earth)  MOBILE except aeronautical mobile <u><b>MOBILE SATELLITE (Earth-to-space)</b></u>   671 722 743 <u><b>(Earth-to-space)</b></u>	

**MHz**  
**2010 - 2200**

Allocation to Services		
Region 1	Region 2	Region 3
<b>2010 - 2025      FIXED</b>  <b>MOBILE</b>  <u><b>MOBILE-SATELLITE (Earth-to-space)</b></u>  <b>746A</b>		

<b>2160 - <u>2165</u></b>  FIXED MOBILE  746A	<b>2160 - 2170</b>  FIXED MOBILE  MOBILE-SATELLITE (space-Earth)  746A 726B 746C	<b>2160 - <u>2165</u></b>  FIXED MOBILE  746A
<b>2165 - 2170</b>  FIXED MOBILE  <u><b>MOBILE-SATELLITE</b></u> (space-to-Earth)  746A		<b>2165 - 2170</b>  FIXED MOBILE  <u><b>MOBILE-SATELLITE</b></u> (space-to-Earth)  746A

**Reason:**

To provide additional allocations for the mobile-satellite service.

**MHz**  
**2300-2450**

Allocation to Services		
Region 1	Region 2	Region 3
<b>2300 - 2450</b> <b>FIXED</b> <b>Amateur</b> <b>Mobile</b> <b>Radiolocation</b>  <b>664 743A 752 <u>752A</u></b>	<b>2300 - 2450</b> <b>FIXED</b> <b>MOBILE except aeronautical mobile</b> <b>RADIOLOCATION</b> <b>Amateur</b>  <b>664 751 752 <u>752A</u></b>	

752 The band 2400 - 2500 MHz (centre frequency 2450 MHz) is designated for industrial, scientific and medical (ISM) applications. Radio services operating within this band must accept harmful interference which may be caused by these applications. ISM equipment operating in this band is subject to the provisions of No. 1815.

**ADD** 752A The band 2300-2310 MHz may also be used by the Mobile-Satellite Service on a primary basis in either the space-to-Earth or Earth direction. The band 2390-2400 MHz may also be used by the Mobile-Satellite service (Earth-to-space) on a primary basis. The band 2402-2417 MHz may also be used by the Mobile-Satellite service (space-to-Earth) on a primary basis.

**Reason** to provide more spectrum for MSS on a global basis.

### 3.7.3 Regulatory Changes to Radio Regulations - Revisions to Resolution 46

**Add 2.5 bis** Those fixed service assignments, identified in 2.5.4 and 2.5.5 where the PFD/FDP in Recommendation (TG 2-2/TEMP.89 (Rev1) are exceeded, but receive protection in accordance with the application of the method in Recommendation (TG2-2/TEMP/100 (Rev2) are excluded from the requirement to coordinate.

**Add 2.7.1 bis**

- i) shall assess the systems compliance with the thresholds set forth in Recommendation (TG 202/TEMP/89 (Rev2) of the systems resultant parameters do not exceed the thresholds in this Recommendation in the bands concerned. There is no need for coordination with the fixed services.
- ii) If the system parameters exceed the thresholds in 2.7.1 bis (i) the Bureau shall use the standard computation program in Recommendation (TG 202/TEMP/100 (Rev2) taking into account the

system specific characteristics and the referenced characteristics of the FS systems, to calculate interference levels to identify geographic areas in which the protection criteria referenced in Rec. (TG 202/TEMP/100 (Rev1) for the referenced analogue/digital FS systems are not met.

iii) The BR shall publish both the Appendix 3 parameters and the list of administrations which it considers potentially affected.

Add 2.8 bis

i) If, within the six month period referred to above, no objection is received from any administration, including those identified by the Bureau in the Special Section, the notifying administration is considered as having successfully coordinated the non-GSO MSS system with the fixed services.

ii) Upon receipt of the publication mentioned in Section 2.7.2, an administration which has not been included in the list of affected administrations by the BR may, within the six month period referred to above, request to be included if it considers that it could be affected (Paragraph 2.8 of Annex to Resolution 46). However, this inclusion needs to be validated by the BR on the basis of the criteria.

iii) The notifying administration and any administration that provided an objection on the planned non-GSO MSS system within the six month period would enter into detailed coordination consultations using actual FS stations and characteristics.

Reason

To provide for use of the system specific characteristics of MSS systems in certain 1-3 GHz downlink MSS allocations.

MOD Footnote (1) to Section 3.1, Res. 46

1 The coordination area is defined as the service area in which it is intended to operate the typical earth stations, extended in all directions by a coordination distance determined according to ITU-R IS 847 except for aircraft stations where a coordination distance of 500 Km and the method of ITU-R IS 850 should be used. ~~or as a circular zone with a radius of 500 Km centered on the coordinates of the fixed earth station. For a service area in which aircraft earth stations operate, the coordination area is the service area extended in all directions by a coordination distance of 1000 Km.~~

Reason

To reduce the coordination area for Non-GSO MSS earth stations.

Add Section II, 2.3.

For the assignments identified in Section 2.5 those which are in the affected region may be determined by the calculation method in Draft New Recommendation (WP-8D/TEMP/1 (Rev.1), December 8, 1994.

Reason

To define the region for coordination of MSS system assignments.

**APPENDIX 3.8.1**  
**IWG-3 - MSS ABOVE 1 GHZ - LIST OF PARTICIPANTS**

<b>Audrey Allison</b>	<b>FCC</b>
<b>Melvin Barmat</b>	<b>Jansky\Barmat</b>
<b>Richard Barnet</b>	<b>TRW</b>
<b>Jeff Binckes</b>	<b>COMSAT Mobile Communications</b>
<b>Sandra Bisbey</b>	<b>Telecommunications Systems</b>
<b>James R. Carroll</b>	<b>SFA</b>
<b>T. Stephen Cheston</b>	<b>Iridium, Inc.</b>
<b>Christine M. DiLapi</b>	<b>Motorola</b>
<b>James G. Ennis</b>	<b>Iridium, Inc.</b>
<b>Richard Evans</b>	<b>AMSC</b>
<b>Ben C. Fisher</b>	<b>Fisher, Wayland</b>
<b>Diane Garfield</b>	<b>State</b>
<b>Thomas Gergely</b>	<b>NSF</b>
<b>Richard Gould</b>	<b>Telecommunications Systems</b>
<b>William Hatch</b>	<b>NTIA</b>
<b>Cecily Holiday</b>	<b>FCC</b>
<b>William Horne</b>	<b>STEL</b>
<b>Donald Jansky</b>	<b>Jansky/Barmat</b>
<b>Andy Haire</b>	<b>MCI</b>
<b>Steven Heppe</b>	<b>Loral Qualcomm</b>
<b>Kris Hutchison</b>	<b>Aeronautical Radio</b>
<b>Ken Keane</b>	<b>Winston &amp; Strawn</b>
<b>Thomas Keller</b>	<b>VLBMH</b>
<b>Kristi Kendall</b>	<b>FCC</b>
<b>Perry Klein</b>	<b>AMSAT</b>
<b>Damon C. Ladson</b>	<b>FCC</b>
<b>Barry Lambergman</b>	<b>Fletcher Heald</b>
<b>Ronald Lepkowski</b>	<b>CCI</b>
<b>Lon Levin</b>	<b>AMSC</b>
<b>Mark N. Lewellen</b>	<b>Westinghouse</b>
<b>Robert May</b>	<b>U.S. Air Force</b>
<b>Edward Miller</b>	<b>Teledesic</b>
<b>Sam Nguyen</b>	<b>COMSAT Mobile Communications</b>
<b>Kaye Nilson</b>	<b>Compass Rose International</b>
<b>Walter Pappas</b>	<b>for U.S. Coast guard</b>
<b>Mahasti Pourdastan</b>	<b>BA</b>
<b>Jay Ramasastry</b>	<b>LQP/Qualcomm</b>
<b>Brian Ramsey</b>	<b>NTIA</b>
<b>Edward Reinhart</b>	<b>Consultant for Hughes Aircraft</b>
<b>Glenn Richards</b>	<b>Fisher, Wayland</b>
<b>Warren G. Richards</b>	<b>State</b>
<b>Paul Rinaldo</b>	<b>ARRL</b>
<b>Bev Sincavage</b>	<b>LTA</b>
<b>Thomas Sullivan</b>	<b>CSC</b>
<b>Leslie Taylor</b>	<b>Leslie Taylor Associates</b>
<b>Wes Vivian</b>	<b>Wireless Cable Association</b>
<b>James Vorhies</b>	<b>NTIA</b>

Alix Watson  
Jack Wengryniuk  
Gerry Wigger  
Richard Wilder  
Bret Wilson

Air Touch Communications  
COMSAT LABS  
SFA  
ARRL  
Rockwell



**Appendix 3.8.2**  
**IWG-3 - MSS ABOVE 1 GHZ**  
**LIST OF DOCUMENTS**

No.	Source	Title
01	Richards	Agenda - June 16, 1994
02	WRC-93	Res. 1 -Agenda for WRC-95
03	IAC	IWG-3 Terms of Reference
04	IAC	IWG-3 Proposed Work Program
05	IAC	Proposed IAC Meeting Schedule
06	Richards	Meeting for IWGs 3, 4 & 5
07	Jansky	1-3 GHz MSS Spectrum Requirements
08	WRC-93	Rec. 2, MSS Networks Published Under Res 46
09	ITU-RB	Report on the Experience of the RB in the Application of Res. 46
10/2	Levin	History of MSS International Allocations
11/2	LTaylor	Spectrum Requirements Section of IWG-3 Preliminary Report
12	Levin	Proposal for the Bands 1530-1544/1626.5-1645.5 MHz and 1545-1559/1646.5-1660.5 MHz
13	Barmat	Proposal for FN 731E, 1610-1626.5 MHz
14	Sullivan	Proposal for the Band 1675-1710 MHz
15	Binckes	Proposal for FN 746B, 1970-2010/2160-2200 MHz
16	Levin	Proposal for the Bands 2010-2025/2165-2170 MHz
17/2	Lewellen	Proposal for Revision of Power Flux Density (PFD) Limits in the 2483.5-2500 MHz Band as Provided in Footnote 753F and RR 2566
18	Binckes	Proposal for Rec. 2, MSS Networks Published Under Res. 46
19	Jansky	Experience with Application of Resolution 46 and Associated RR Provisions (TG 8/3-12)
20	Carroll	Regulatory, Operational and Technical Constraints,1492-1525 MHz Band
21	Lepkowski	Relative Status of Services in FN 731E
22	DiLapi	Modification of the Date of Entry into Force of 2 GHz MSS Allocations
23	Jansky	A Framework for pfd Triggers in the MSS Bands
24	Jansky	Implementation of NGSO MSS Coordination Method
25	Binckes	Applicability of RR 2566 to FN 746B
27	Levin	Mobile Satellite Service Allocations in the 2500-2535 MHz (space to Earth) and 2670-2690 MHz (Earth to space) Bands
28	Ladson	Minutes - June 16, 1994 Meeting
29	EC	Comments on FCC Notice of Proposed Rulemaking
30	ITU Council	Future Conferences of the Union
31	Fisher	Minutes - July 5, 1994 Meeting
32	Long	Summary of ITU-R Activities 1452-1525 MHz

33	Binckes	Method for Converting MSS Voice Traffic Demand Forecasts into Spectrum Requirements (MSS Networks above 1 GHz)
34	Fisher	Minutes - July 19, 1994 Meeting
35	Fisher	Minutes - August 16, 1994 Meeting
36	Levin	New Mobile-Satellite Service Allocation in the 1559-1569 MHz Band (space to Earth)
37	Jansky	Contribution to Regulatory Issues Section (VI) of IWG-3 Preliminary Report
38	NTIA	Spectrum Use Summary, 137 MHz - 5 GHz
39	Binckes	Draft IWG-3 Report Element: section IV.A, Advancement of Date of Entry Into Force-FN 746B
40	LTaylor	Outline for U.S. Proposals Section of IWG-3 Preliminary Report
41	Gould	Footnotes RR 731E and 733E to the 1610-1626.5 MHz Band
42	Lewellen	Draft Text for Section IX of IWG-3 Preliminary Report, Recommendations for WRC-97 Agenda
43	Fisher	Minutes - November 8, 1994 Meeting
44	IWG-3	Preliminary Draft Report
45	Rinaldo	Minutes - December 13, 1994 Meeting

### **APPENDIX 3.8.3**

#### **Analysis of MSS Bands**

##### **I. 1492-1525 MHz (Space to Earth)**

Generic MSS in Region 2 only, except in the United States where the band is used for aeronautical telemetry. MSS subject to Resolution 46; PFD RR 2566.

##### **II. 1525-1544, 1545-1559 MHz (Space to Earth) and 1626.5-1645.5, 1646.5-1660.5 MHz (Earth to Space)**

A. 1525-1530 MHz - Generic MSS in Region 2 and 3; Primary maritime mobile satellite in Region 1; secondary land-mobile satellite service in Region 1 MSS subject to Resolution 46; PFD RR 2566, limited to non-speech low bit rate data transmissions.

B. 1530-1544 (Space to Earth)/1626.5-1645.5 (Earth to Space) - Generic MSS in seven countries; subject to priority for maritime distress and safety communications

(1) 1530-1533/1631-1634.5 MHz - Land MSS and maritime MSS, primary in all three regions.

(2) 1626.5-1631.5 MHz - MSS primary in Regions 2 and 3; primary maritime MSS and secondary land MSS in Region 1.

(3) 1533-1544/1635.5-1645.5 MHz - Maritime MSS primary in all three regions; land MSS secondary.

(4) 1544-1545/1645.5-1646.5 MHz - MSS primary in all three regions.

C. 1545-1559/1646.5-1660.5 MHz - MSS subject to Resolution 46; PFD RR 2566.

(1) 1545-1555 (Space to Earth)/1646.5-1656.5 MHz (Earth to Space) - Aeronautical safety MSS primary in all three regions.

(2) 1555-1559 (Space to Earth)/1656.5-1660.5 (Earth to Space) MHz - Land MSS primary in all three regions; in five countries, band is allocated to generic MSS and in Argentina and U.S. subject to priority for aeronautical safety services.

D. 1660-1660.5 MHz (Earth to Space) - Land mobile satellite in all three regions. FN 730C provides alternative MSS allocation subject to coordination.

##### **III. 1610-1626.5 MHz (Earth to Space)/2483.5-2500 MHz (Space to Earth)** - Generic in all three regions, subject to Resolution 46.

A. 1610.6-1613.8 MHz - Radio Astronomy issue 733E

feeder links ES's. This is an important consideration in a system where the exact locations and numbers of the feeder link ES's are unknown at the design stage.

Additionally, systems using these frequencies can use well developed technology in a band where propagation impairments do not result in significant cost impact. The resulting need for relatively small link margins can be exploited through the use of relatively low cost feeder link ES's.

#### 8-17.7 GHz (Ku-Band):

One of the advantages of this range of frequencies is that it contains a virtually unused 500 MHz portion of spectrum that is currently included in the WARC-88 Allotment Plan allocations. There are also a number of other FSS bands available at Ku-Band, although coordination with VSAT's, TVRO's, and BSS feeder links may make implementation of MSS feeder links difficult. The desire to avoid the rain fading and site-diversity problems that are inherent at Ka-band also make this band attractive.

#### 20-30 GHz (Ka-Band):

Among the reasons for choosing this part of the spectrum are that at present it is relatively lightly used, relatively easy to coordinate, and contains a significant bandwidth allocation. In addition, the utilization of narrower feeder link beams on the satellite, without recourse to large satellite reflectors, provides the additional link gain required to overcome rain fade effects. Finally, in system designs which provide for flexibility in the location of feeder link earth stations, due to either increased orbit altitude or the use of inter-satellite links, it is possible to locate feeder link stations in areas of low rainfall, thereby avoiding some of the rain attenuation problems normally associated with this frequency band.

### **3.2 Co-Directional vs. Reverse Direction Use of FSS Bands**

#### Co-Directional Use

In principle, any frequency band allocated to the FSS may be used co-directionally by MSS feeder links without modifications to the Table of Frequency Allocations. In practice, however, it is clear that not all FSS bands are attractive for

**The coordination process for assignments of non-GSO MSS systems and fixed services (description of approach)**

In the following , Administration A is the one planning to implement an assignment in a non-GSO MSS system. Administration B is the one whose FS assignments overlap with those of Administration A and could be affected. The proposed coordination approach would consist in applying the following steps (see Figure 1):

- a) An administration wishing to establish a non-GSO MSS system submits to the Bureau complete Appendix 3 information, including system specific characteristics, under § 2.6 of Section II of the Annex to Resolution 46 (WARC-92). This information shall include all the parameters required both to make the calculations required to assess compliance with Recommendation xxx [doc 2-2/Temp/83 Rev2] and to run a simulation on the standard computation program described in Annex 1 to Recommendation zzz [Doc 2-2/TEMP/80 Rev2] to check if the coordination thresholds specified in Recommendation xxx for the protection of the analogue and digital FS systems are met.
- b) The Bureau shall review the information for completeness and, performing the required calculations, shall assess the system's compliance with the limits set forth in Recommendation xxx [doc 2-2/TEMP/83 Rev2]. If the system's resultant parameters do not exceed the limits set forth in Recommendation xxx, there is no need for coordination with fixed services.
- c) If the system's parameters exceed the limits set forth in Recommendation xxx, the Bureau shall use the standard computation program described in Annex 1 of recommendation zzz and, taking into account the system-specific characteristics for the non-GSO MSS system and the reference characteristics of the FS systems in the band (s) involved, per § 2.5, Section II, Annex to Resolution 46 (WARC-92), calculate interference levels as appropriate to identify geographic areas and thus administrations in whose territory the protection criteria referred to in recommendation zzz for the reference analogue/digital FS systems are not met.
- d) Then the BR publishes both the Appendix 3 parameters and the list of administrations which it considers to be potentially affected. This list supersedes that mentioned in note 1 under 2.7.2 of the Annex to Resolution 46.

Using the present provisions of Resolution 46, affected administrations are limited to those having FS assignments either "recorded in the Master Register" (2.5.4) or "not notified, but in use or planned to be brought into use within the next three years" (2.5.5), and which in addition might be affected according to the results of the pfd/FDP calculations and/or the application of the method in Recommendation zzz. Since the BR can know only of assignments in the first category (recorded in the Master Register), this list cannot contain administrations in the second category (with assignments not notified, but in use or planned to be brought into use within the next three years). The administrations falling in this second category, or for which an omission may

have occurred should therefore have the possibility to make themselves known, which is the purpose of step e).

- e) Administrations review the published information (per § 2.8, Section II, Annex to Resolution 46 (WARC-92)) with a view to comment within six months from the date of publication of the relevant Special Section, and provide technical details of the terrestrial stations upon which any negative comment is based.
  - If, within the six month period referred to above, no objection is received from any administration, including those identified by the Bureau in the Special Section, the notifying administration is considered as having successfully coordinated the non-GSO MSS system with the fixed services.
  - Upon receipt of the publication mentioned in section 2.7.2, an administration which has not been included in the list of affected administrations by the BR may, within the six month period referred to above, request to be included if it considers that it could be affected (Paragraph 2.8 of Annex to Resolution 46). However, this inclusion needs to be validated by the BR on the basis of the criteria mentioned in paragraph d) above.
- f) The notifying administration and any administration that provided an objection on the planned non-GSO MSS system within the six month period mentioned in paragraph e) would enter into detailed coordination consultations using actual FS stations and characteristics (see Annex A).
- g) Administrations should then communicate to the Bureau any modifications to the published characteristics of their respective networks or stations required to reach agreement on the coordination. The Bureau would publish these modifications indicating that they resulted from the efforts of the administrations concerned to reach agreement on the coordination of the non-GSO MSS system.

This procedure retains the current approach of Resolution 46 procedure, and is expected to necessitate only straight forward modification to the existing text of Resolution 46 procedure. A possible text for these modifications is provided as an illustration of this simplified approach (see Annex B).

**FCC INDUSTRY ADVISORY COMMITTEE**  
**FOR THE**  
**ITU 1995 WORLD RADIO COMMUNICATION CONFERENCE**

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**INTERIM REPORT**  
**OF**  
**INFORMAL WORKING GROUP 4**

~ ~ ~ ~

**Jack Wengryniuk**  
**Chair**

**Michael L. Richmond**  
**Vice Chair**

**Interim Report of  
WRC-95 Industry Advisory Committee  
Informal Working Group 4 (Feeder Links)**

1. **Introduction**
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6. **U.S. Proposals for MSS Feeder Link Spectrum**



## **1. Introduction**

Informal Working Group 4 (IWG-4) of the FCC Industry Advisory Committee for WRC-95 is tasked with developing U.S. industry consensus positions on proposals for preferred FSS frequency bands which could support MSS feeder link spectrum. As such, the IWG has been considering a number of issues related to the provision of MSS feeder link spectrum. This interim report represents the current views of IWG-4 on this topic and work shall continue through the early part of 1995 in order to resolve all outstanding issues.

IWG-4 has met six times to date, and was well attended on all occasions by U.S. industry and government participants (See Attachment 1 for IWG-4 Participants List). It should be noted that many of the participants in IWG-4 were also very actively involved in a similar international effort on this same topic coordinated by the International Telecommunications Union (i.e. ITU-R Task Group 4/5). Task Group 4/5 was responsible for developing the technical basis for MSS feeder link use of various FSS bands and this Task Group has recently completed its work and will be submitting a report to the Conference Preparatory Meeting.

While there were times where this cross participation in IWG-4 and Task Group 4/5 resulted in scheduling conflicts, in general IWG-4 has benefited greatly from this fact. Much of the work done in preparation for, and during, the international meetings of Task Group 4/5 was directly applicable to the work of IWG-4. In fact, much of the content of this Interim Report has already been vetted internationally and this will no doubt serve to further its acceptance at WRC-95.

This Interim Report contains reasonably stable text pertaining to the Overall Spectrum Requirements for MSS Feeder Links (Section 2), the Considerations Relating to the Choice of Frequency Bands (Section 3) and Feasibility of Frequency Sharing Between MSS Feeder Links and Other Services (section 4). In the area of Regulatory and Procedural Issues (Section 5), much of the text recently agreed by ITU-R Task Group 4/5 has been included in this Interim Report. While IWG-4 participants were actively involved in the development of this text, and endorse it, there may be some areas still requiring the specific attention of the IWG. Finally, specific U.S. Proposals for MSS Feeder Link Bands have yet to be developed, however, as can be seen in Section 6 of this Interim Report, IWG-4 has been able to narrow the scope of this topic and shall be considering a specific set of frequency bands in its further work.